Varian, Inc.
2700 Mitchell Drive
Walnut Creek, CA 94598-1675/USA

CP–8200 / SPME Control

Galaxie Driver Manual

©Varian, Inc. 2005
03-914947-13:Rev. 3

Table of Contents

Introduction **2**

General 2

Installation and Configuration **3**

Installing the Driver Software 3
Configuring the Driver 3
Configuring the CP-8200 / SPME *3*
Configuring the Synopsis *10*

Building a Method **12**

Creating a New Method 12
Control Method Section for the Varian CP-8200 / SPME 15
Main Control *17*
Automixes Control *23*

Starting and Viewing an Acquisition **26**

Quick Start and Sequence 26
Quick Start (Single Acquisition) *26*
Sequence *28*
Running Acquisition Status 29
Viewing a Running Acquisition *29*
Status of the CP-8200 / SPME *29*

Introduction

General

This document describes the configuration of the Varian CP-8200 / SPME driver. It also explains how to build a control method for this driver, how to start and view a running acquisition, and what actions are available during an analysis.

Installation and Configuration

Installing the Driver Software

To install the Galaxie Drivers software refer to the Galaxie installation Guide.

Configuring the Driver

The driver software configuration is done in the Galaxie Configuration Manager when a new chromatographic system is created.

Configuring the CP-8200 / SPME

Click on the button corresponding to the Varian CP-8200 / SPME driver and the configuration screen appears.

Several sub-sections allow you to configure the instrument: *Communication*, *Hardware* and *Advanced*.

The toolbar allows you to easily scroll through the configuration windows:

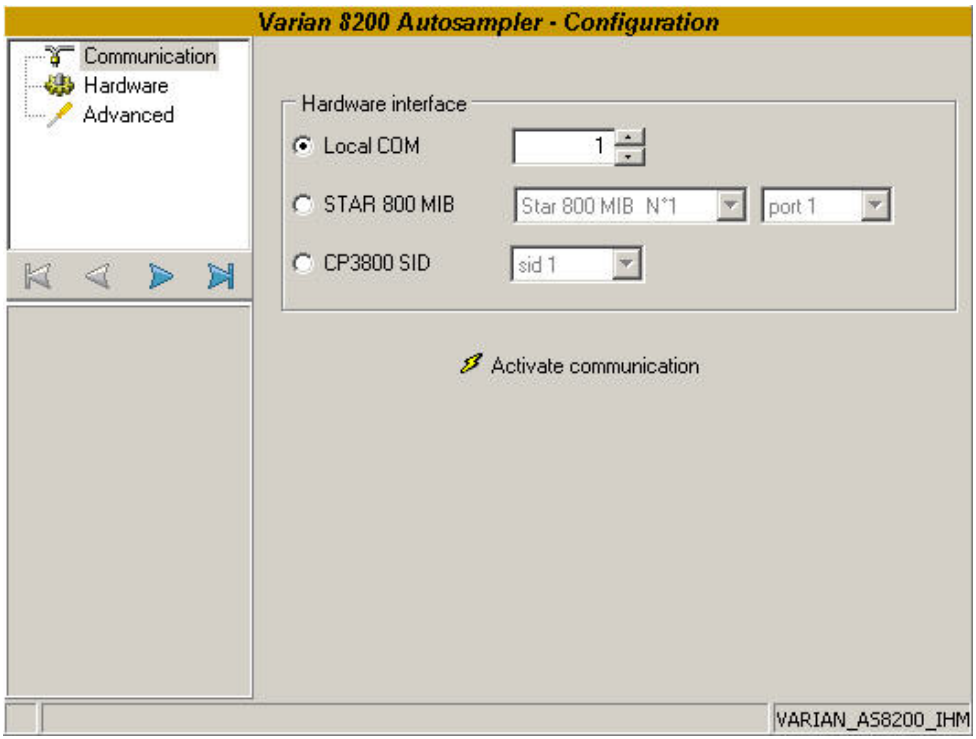
to select the first configuration window.

to select the previous configuration window.

to select the next configuration window.

to select the final configuration window.

Communication Window



Hardware Interface Parameter Group:

Select *Local COM*, if the autosampler is connected directly to the acquisition server. Then, enter the COM port number.

Select *STAR 800 MIB*, if the autosampler is connected to an 800 MIB. Then, select in the dropdown list the 800 MIB name and the port number of the 800 MIB.

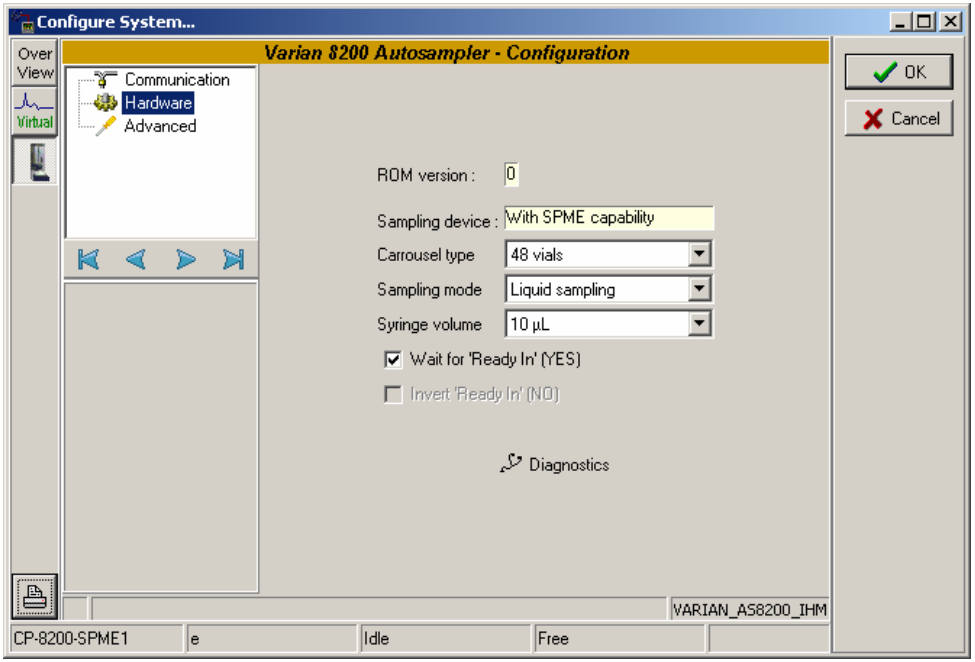
Select *CP3800 SID*, if the autosampler is connected to a CP-3800. Then select the SID port in the dropdown list.

Press the

button to automatically get the configuration from the instrument.

NOTE: For more details about the Bus configuration, refer to the section *Configuring the Communication Server* of this manual.

Hardware Window



ROM version: Displays the version of the ROM which has been installed on the CP-8200 / SPME

Sampling device: Three configurations are available depending on the instrument configuration:

- Unknown.
- With SPME capability
- No SPME capability

Carrousel type: Select the tray that is to be used on the Autosampler between 12 or 48 Vials.

Sampling mode: This parameter depends on the *Sampling device*. If the SPME capability has been configured, select the sampling mode between *Liquid sampling* and *SPME.* If No SPME capability has been configured, the sampling mode is automatically set to *Liquid sampling.*

Syringe volume: Select the size of the syringe that is installed on the Autosampler either 10 µL or 100 µL.

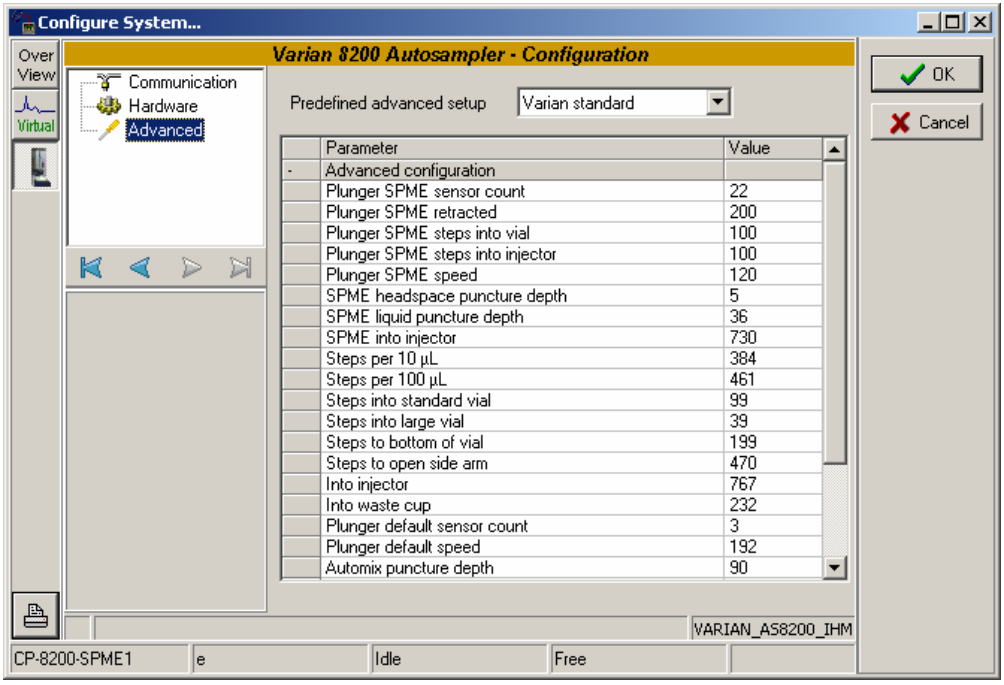
Check or uncheck the *Wait for ready in* to activate or deactivate this option. If it is checked, the Autosampler waits for a hardware "ready" input signal before starting. When unchecked, the hardware "ready" input is ignored.

Check or uncheck the *Invert ready in* to activate or deactivate this option. If it is checked, the system will wait for a switch "open" signal before starting. If unchecked, a normal switch "closed" signal will cause the system to start.

The

button is reserved to service people. It allows you to test the CP-8200 / SPME Autosampler configuration.

Advanced Window



Select the *Predefined advanced setup* that is to be used by the instrument:

- Varian standard
- 2 cm SPME fiber
- HP5890
- User defined

If *User defined* option is selected, all the parameters can be entered manually.

Plunger SPME sensor count: Defines the location of the SPME plunger using the 1.75" fiber relative to the sensor on the autosampler carriage.

Plunger SPME retracted: Defines the number of steps that the SPME plunger will be retracted after sampling.

Plunger SPME steps into vial: Defines the number of steps that the fiber will be extended into the vial during liquid SPME sampling.

Plunger SPME steps into injector: Defines the number of steps that the fiber will be inserted into the injector.

Plunger SPME speed: Defines the speed at which the SPME plunger will be moved in steps/second.

SPME headspace puncture depth: When headspace is requested, this parameter defines how far into the sample vial the fiber will be inserted during headspace sampling.

SPME liquid puncture depth: Defines how far the SPME fiber guard will penetrate into the vial.

SPME into injector: Defines how far into the injector the SPME fiber guard will travel.

Steps per 10 µL: The 8200 will use this value to calculate the correct number of stepper motor steps/µL for a 10 µL syringe.

Steps per 10 µL: The 8200 will use this value to calculate the correct number of stepper motor steps/µl for a 100 µL syringe.

Steps into standard vial: Defines the number of syringe carriage steps to reach the liquid sampling point of a standard 2 mL vial.

Steps into large vial: Defines the number of syringe carriage steps to reach the headspace sampling point of a 12 mL vial (standard for headspace).

Steps to bottom of vial: Defines the number of syringe carriage steps for the syringe needle to touch the bottom of a vial.

Steps to open side arm: Defines the number of steps the plunger must be raised to allow solvent to be flushed through the side-arm syringe and into the waste cup.

Into injector: Defines the number of carriage steps from the carriage home position into the injector.

Into waste cup: Defines the number of carriage steps from the carriage home position into the waste cup.

Plunger default sensor count: Defines the number of steps past the sensor the plunger will use as its home position.

Plunger default speed: Defines the number of steps/second that the plunger will use as its speed during injection.

Automix puncture depth: This parameter is used to calculate the number of steps the syringe carriage must descend into a vial when automix is used.

Plunger mix speed: Defines the number of steps/second that the plunger will use as its speed during mix

Carriage away from home: Defines the number of steps from the carriage home position.

Plunger away from home: Defines the number of steps from the plunger home position.

Fast suck and squirts: Defines the suck (5 µL/s) and squirt (10 µL/s) speed during neat extraction.

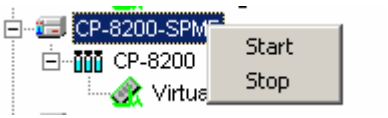
Slow suck and squirts: Defines the suck (2 µL/s) and squirt (10 µL/s) speed during neat extraction.

Configuring the Synopsis

In the *Overview* part of the system configuration, a synopsis can be defined for the system. This synopsis depends on the configured devices.

1. To save the configuration of these devices, click on the *OK* button.

2. Right click on the system name in the bottom part of the ***Galaxie Configuration Manager*** screen. A pop-up menu appears: click on *Stop.* Then right click on the system name again, and click on *Start*.

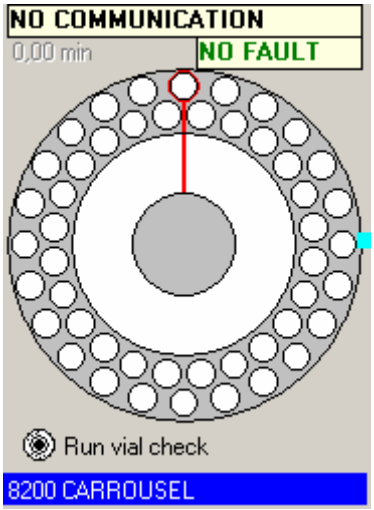


3. Go back to the System Configuration screen (***Properties*** wizard). A graphic of the devices that comprise the system is displayed in the synopsis screen. To configure the synopsis as the real instrument configuration, move each module, and then connect it appropriately. To do this, select one anchor for each of the two modules (the selected anchors become red) and click on the button; a connection tube will appear between the two anchors.

   Click on the button to delete a selected tube, click on the button to delete all the tubes.
   Click on to define a background color, or on to make the background transparent.
   Click on the icon to change the grid color.

4. Once the synopsis configuration is complete, it will be displayed in the Galaxie Chromatography Data System, in the *Systems* tab. In this tab, the *Overview* part will show the synopsis of the system with some parameters displayed (temperature, flow, signal, etc.) depending on the installed devices.

For example, the following pictures represent the synopsis of the Varian CP-8200 / SPME:



Galaxie Configuration Manager Screen

Galaxie Chromatography Data System Screen

NOTE: Once the system has been created and correctly configured, it must be associated with one or more projects in order to start acquisitions. For more details about the creation and configuration of a system, refer to the Galaxie Configuration Manager User's Guide.

Click on the button to print the current configuration.

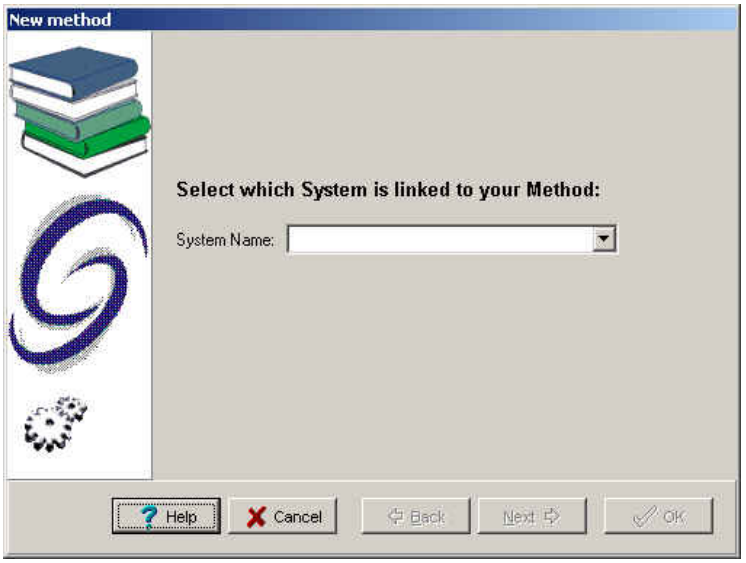
Building a Method

Creating a New Method

The method contains parameters for instrument control, data acquisition, chromatogram processing, and editing of final results. To initially set up a method, it is not necessary to define all of the sub-method sections; however, you must fill in the instrument control section prior to starting an acquisition.

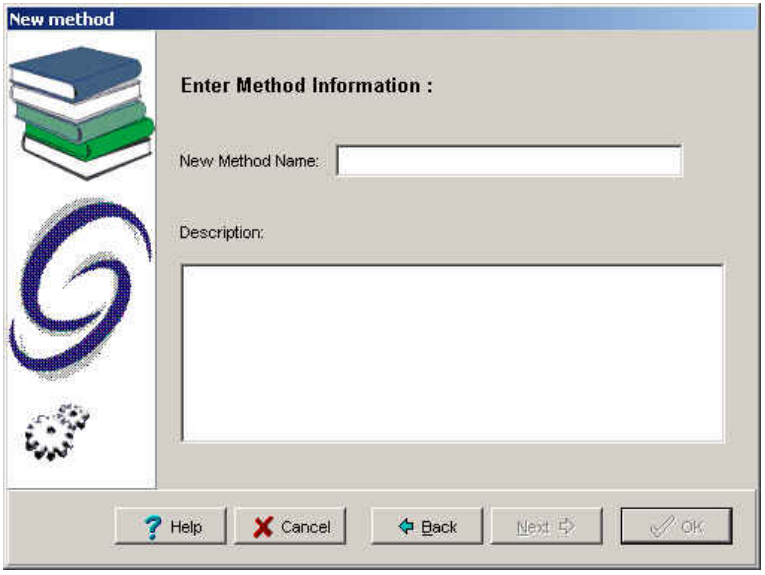
1. To create a new method, select the ***FILE / NEW METHOD*** option from the Galaxie Chromatography Data System main menu.

   A wizard guide will appear and provide assistance during the first steps of method creation:



2. Choose the system (chromatograph) associated with the method. A method is created for a particular system. When starting an acquisition, the name of the system that performs the acquisition must be correct, since method access is limited only to those methods associated with this system.

3. Once this field is completed, click on the *Next* button to move to the second step of the method creation:



4. Enter the *New Method Name* in the first field. In the *Description* field, enter information concerning the method (optional).

5. Once these two fields have been completed, click on the *OK* button. The new method is created and is opened with default parameters in the Galaxie Chromatography Data System. The next step is the definition of each of the method sections.

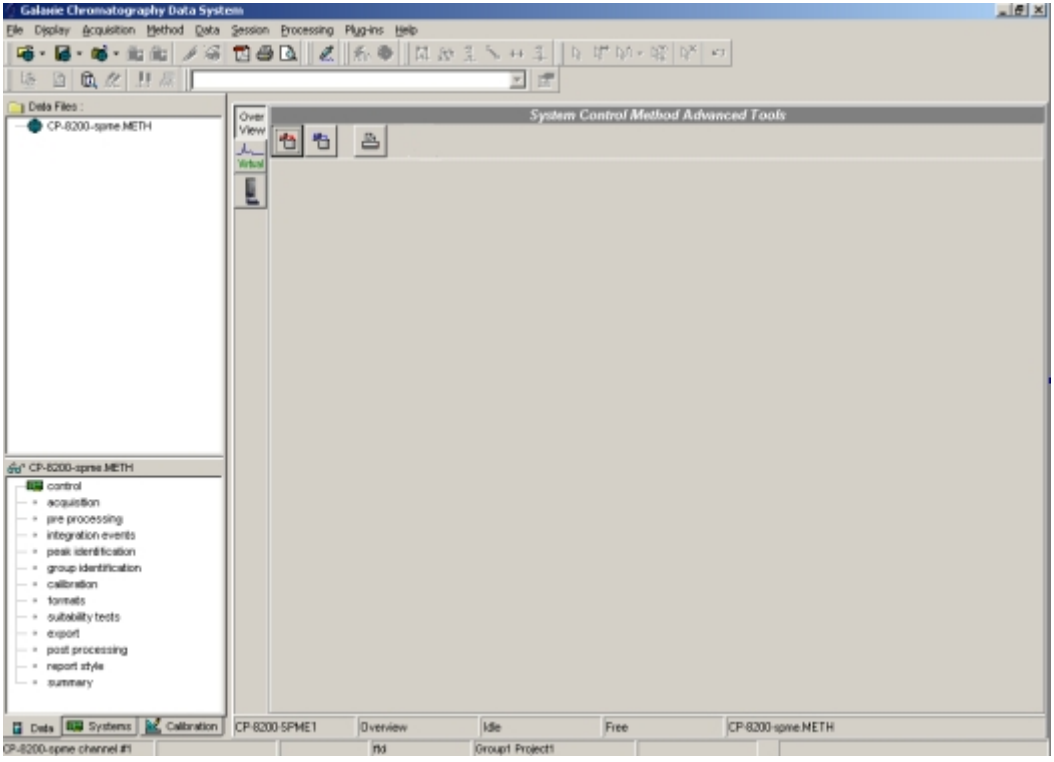
   The control section must be defined in order to start an acquisition. In the following part of this guide, only the control section for the Varian CP-8200 / SPME is detailed. Other parameters such as *Injection Volume*, *Vial* and *Rack* number may be necessary and are defined in the acquisition section.

NOTE: For more details about the programming of each method section, turn to the Galaxie Chromatography Data System User's Guide.

Control Method Section for the Varian CP-8200 / SPME

Once the new method is created, select the control section in the lower part of the browser.

The following screen appears:



Press the Over View button to display the ***System Control Method Advanced Tools*** window:

To send the current method to the instrument

To get the active method from the instrument

To print the current method

Click on the button to display the CP-8200 / SPME control method section. It contains two sub-sections: *Main* and *Automixes*. Click on the required sub-section to define the corresponding parameters that will be used during the chromatographic run. The toolbar allows you to easily scroll through the control method windows:

to select the first window of the control method.

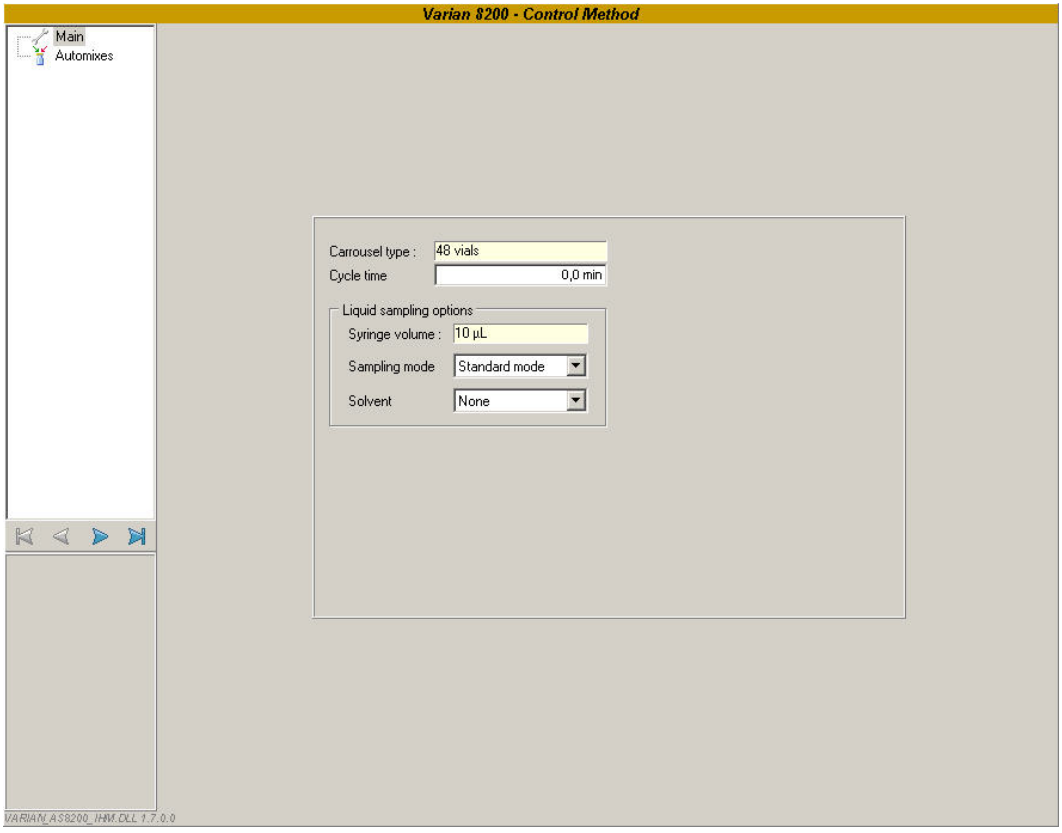
to move back to the previous window of the control method.

to move forward to the next window of the control method.

to select the final window of the control method.

Main Control

If the Liquid sampling mode has been selected in the configuration screen, the following screen is displayed:



Carrousel type: The tray is displayed, depending on the configuration choice: 12 or 48 vials.

The *Cycle time* parameter is the total time of an analysis. This parameter is required only if prep-ahead is used. When using prep-ahead, the prep-vial parameter in the sequence should be set to 2 for this driver.

Liquid Sampling Options Parameter Group:

Syringe volume: The Syringe volume is displayed, depending on the configuration choice: 10 or 100 µL

Solvent: Select the solvent used to wash the syringe after sampling and to create the solvent plug before sampling a vial. Four choices are available: Solvent A wash, Solvent B wash, A then B wash, None. When the A then B wash option is selected, solvent A will be used for solvent plug.

Sampling mode: Select the sampling mode between the five available choices. The Standard mode, Volatile sample, Neat sample, and Viscous sample are pre-programmed with optimized parameters for specific samples. The fifth liquid mode, User defined, allows you to optimize the parameters yourself.

- Standard mode: It is the default mode of operation. The standard sampling mode is a solvent flush, or sandwich method of sampling and injection. The injection parameters are fixed for this mode.

- Volatile mode: Select the Volatile mode when using samples with high vapour pressures at room temperature. The injection parameters are fixed for this mode.

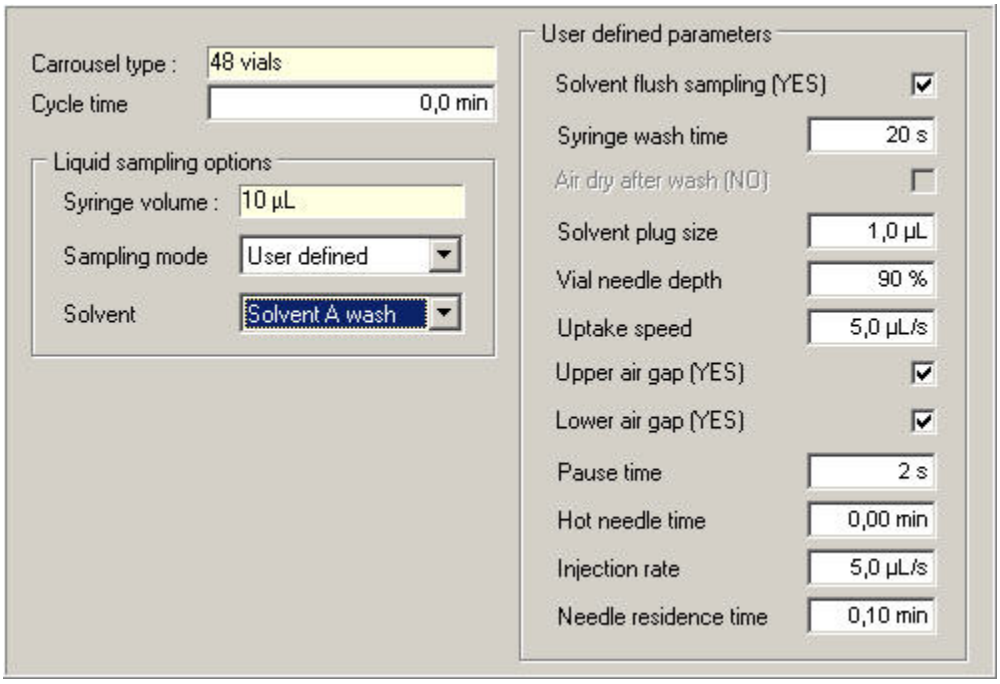
- Neat sample: Select the Neat sample mode when the wash solvent peaks would interfere with the chromatography of the sample. In the neat sampling mode, the sample is drawn into the syringe and then expelled or injected (suck-and-squirt) without the use of air or solvent gaps. The injection parameters are fixed for this mode.

- Viscous sample: Select the Viscous sample mode when injecting samples that have a higher viscosity than water. The injection parameters are fixed for this mode.

Parameter	Volatile Sample	Neat Sample	Viscous Sample	Standard sample mode
Solvent flush sampling	Yes	No	Yes	Yes
Syringe Wash Time	20 sec	40 sec	40 sec	20 sec
Air Dry After Wash	No	No	No	No
Solvent Plug Size	1.0 µL	0.0 µL	1.0 µL	1.0 µL
Needle Depth	90 %	90 %	90 %	90 %
Uptake Speed	1.0 µL/Sec	1.0 µL/Sec	1.0 µL/Sec	5.0 µL/Sec
Upper Air Gap	No	No	Yes	Yes
Lower Air Gap	Yes	Yes	Yes	Yes
Pause Time	6 sec	6 sec	10 sec	2 sec
Hot Needle Time	0.00 min	0.00 min	0.00 min	0.00 min
Injection Rate	1.0 µL/sec	5.0 µL/sec	1.0 µL/sec	5.0 µL/sec
Inj Resident time	0.10 min	0.10 min	0.20 min	0.10 min

- User defined: Select the User defined mode when you want to more carefully tailor the sampling technique.

The following screen is displayed:



User Defined Parameters Parameter Group:

Check or uncheck the *Solvent flush sampling* to activate or deactivate this option. If it is checked, the solvent plug size needs to be specified and whether upper and lower air gaps are to be used. When unchecked, the solvent plug size and upper and lower air gaps are turned off.

Syringe wash time (5-180 sec): It sets the amount of time that the wash solvent will be flushed through the syringe.

Check or uncheck the *Air dry after wash* to activate or deactivate this option. If it is checked, the compressed air supplied to the Autosampler will be blown through the syringe after the wash cycle to dry the syringe. When unchecked, air drying is not done. This parameter may only be selected when *Solvent flush sampling* is not selected.

Solvent plug size (µL): The volume of solvent loaded into the syringe used to flush the sample from the syringe needle during injection (0.0 to 3.0 µL for 10 µL syringe and 0 to 30 µL for 100 µL syringe).

Vial needle depth (0-100 %): It sets the syringe needle depth in the vial. When set to 0, the needle just penetrates the septum. When set to 100, the needle tip almost touches the bottom of the standard 2-mL vial.

Uptake speed (µL/sec): it sets the rate at which the plunger is withdrawn while the syringe needle is in sample vial (1.0 to 5.0 µL/sec for 10 µL syringe and 10 to 50 µL/sec for 100 µL syringe).

Check or uncheck the *Upper air gap* to activate or deactivate this option. If it is checked, an upper air gap (0.5 µL) is included in the solvent flush sample injection.

Check or uncheck the *Lower air gap* to activate or deactivate this option. If it is checked, a lower air gap (0.8 µL) is included in the solvent flush sample injection.

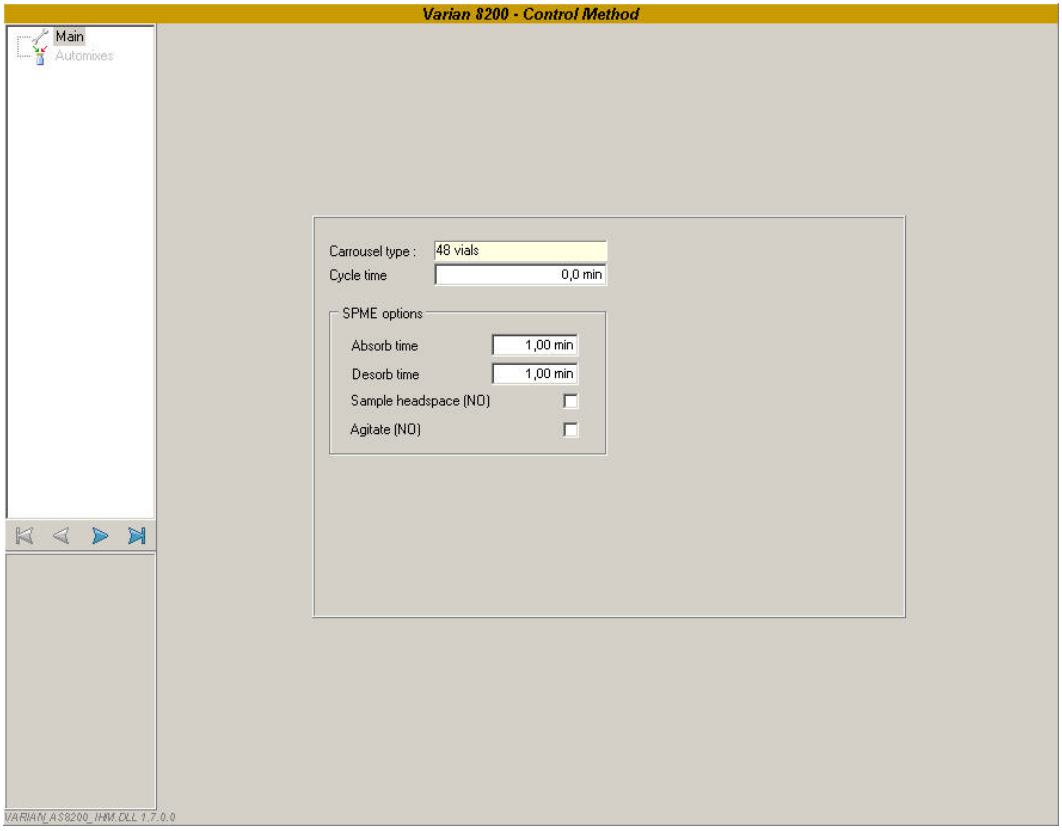
Pause time (1-30 sec): It sets the amount of time that the syringe will be held in the vial after the sample is drawn into the syringe. It allows the pressures to equilibrate and the sample flow into the syringe to stop before withdrawing the syringe from the vial.

Hot needle time (0-1 min): It sets the amount of time that the syringe needle will reside in the hot injector before the sample is expelled from the syringe.

Injection rate (µL/sec): It is the rate at which the sample will be expelled from the syringe into the injector. (0.2 to 10.0 µL/sec for 10 µL syringe and 2 to 100 µL/sec for 100 µL syringe)

Needle residence time (0-10 min): It sets the amount of time that the syringe needle will reside in the hot injector after the sample is expelled from the syringe.

If the SPME sampling mode has been selected in the configuration screen, the following screen in the Main Control is displayed:



Carrousel type: The tray is displayed, depending on the configuration choice: 12 or 48 vials.

The *Cycle time* parameter is the total time of an analysis. This parameter is required only if prep-ahead is used. When using prep-ahead, the prep-vial parameter in the sequence should be set to 2 for this driver.

SPME Options Parameter Group:

Absorb time (0.00-640.00 min): It sets the amount of time the SPME fiber will be extended into the sample for absorption.

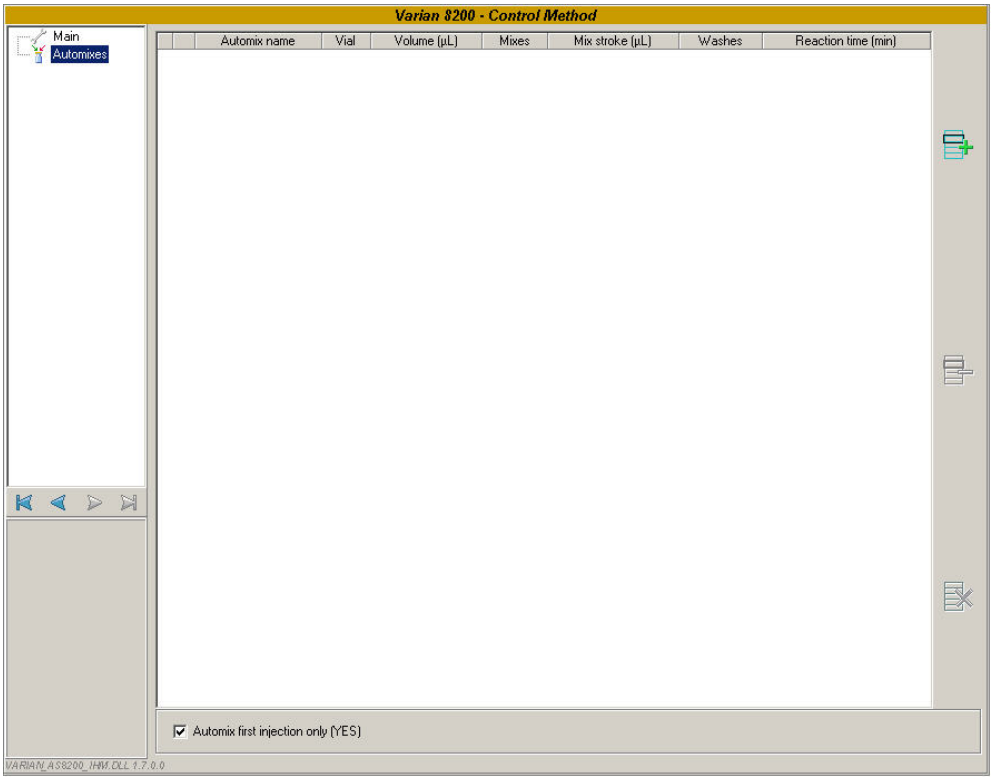
Desorb time (0.00-640.00 min): It sets the amount of time the SPME fiber will be extended into the injector for desorption.

Check or uncheck the *Sample headspace* to activate or deactivate this option. If it is checked, the SPME fiber guide will be inserted just below the septum and the fiber extended into the vapor space for sampling. When unchecked, the fiber guide will be inserted further into the vial and the fiber extended close to the bottom of the vial.

Check or uncheck the *Agitate* to activate or deactivate this option. If it is checked, the sample will be agitated during the absorption time in order to increase the rate at which solutes are extracted by the SPME fiber coating. When unchecked, the sample is not agitated.

Automixes Control

This sub-section is only available if the Liquid sampling mode has been selected in the configuration screen. The following screen is displayed:



Automix name: Enter the name of the automix step.

Vial: Enter the vial number for the source of the reagent to be used in this automix step.

Volume (µL): Enter the volume of the reagent to be drawn and added to the sample. The maximum volume is the syringe volume.

Mixes (1-100): Enter the number of mixing strokes to be done.

Mix stokes (µL): Enter the volume to be drawn into the syringe for each mixing strokes. The maximum volume is the syringe volume.

Washes (0-9): Enter the number of times the syringe will be washed after this automix step.

Reaction time (0.0-99.9 min): Enter the amount of time to wait before doing the next automix steps.

Check *Automix first injection only* to perform the mix program only before the first injection from the vial. When unchecked, the automix program will be performed before each injection.

Use the following buttons to edit the table:

to add a line to the table.

to delete a line in the table.

to clear the entire table.

Starting and Viewing an Acquisition

Quick Start and Sequence

Once the instrument control method has been correctly programmed, an analysis can be started. The next section briefly describes how to start an acquisition.

Quick Start (Single Acquisition)

1. Press the button.

   In the ***Quick Start*** window, select the system, the method and optionally the project if connected in "All project" mode.

2. Press the *OK* button.

   The following screen is displayed:

In the *Acquisition parameters* tab, required fields like the *Run Name*, the *Run ID* and the *Acquisition length* must be filled in before starting an analysis. Furthermore, if the system is equipped with an Autosampler controlled by the Galaxie Chromatography Data System, the *Injection Volume*, the *Vial* position and the *Rack* number (if required) must be entered.

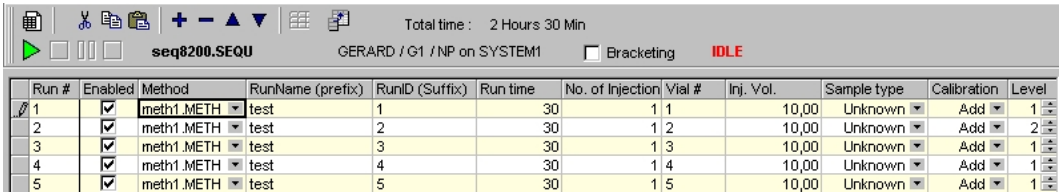
Other parameters associated with each acquisition channel can be entered in the *Channel* X tab.

3. Click on the *Start* button to start the acquisition if the system is a single-injector system or click on the *Next* button if the system is a multiple injector system. In a multiple injector system, the same parameters entered for the first injector must be entered for the other injectors before starting the acquisition.

Sequence

1. To create a sequence, select the ***FILE / NEW SEQUENCE*** menu, and complete the displayed creation wizard screen (refer to the Galaxie Chromatography Data System User's Guide), by entering the system name that will perform the analysis, the number of lines (corresponding to the number of samples), and the sequence name.

2. The sequence is displayed. Complete the sequence information columns (refer to the Galaxie Chromatography Data System User's Guide).



Run #	Enabled	Method	RunName (prefix)	RunID (Suffix)	Run time	No. of Injection	Vial #	Inj. Vol.	Sample type	Calibration	Level
1	☑	meth1.METH	test	1	30	1	1	10,00	Unknown	Add	1
2	☑	meth1.METH	test	2	30	1	2	10,00	Unknown	Add	2
3	☑	meth1.METH	test	3	30	1	3	10,00	Unknown	Add	1
4	☑	meth1.METH	test	4	30	1	4	10,00	Unknown	Add	1
5	☑	meth1.METH	test	5	30	1	5	10,00	Unknown	Add	1

The *Method Name* the *Run Name,* the *Run ID* and the *Acquisition length* must be filled in before starting the analysis. All these parameters are automatically imported from the acquisition part if defined in the method.

3. Start the sequence by clicking on the button.

NOTE: For more details about how to start an acquisition, refer to the Galaxie Chromatography Data System User's Guide.

Running Acquisition Status

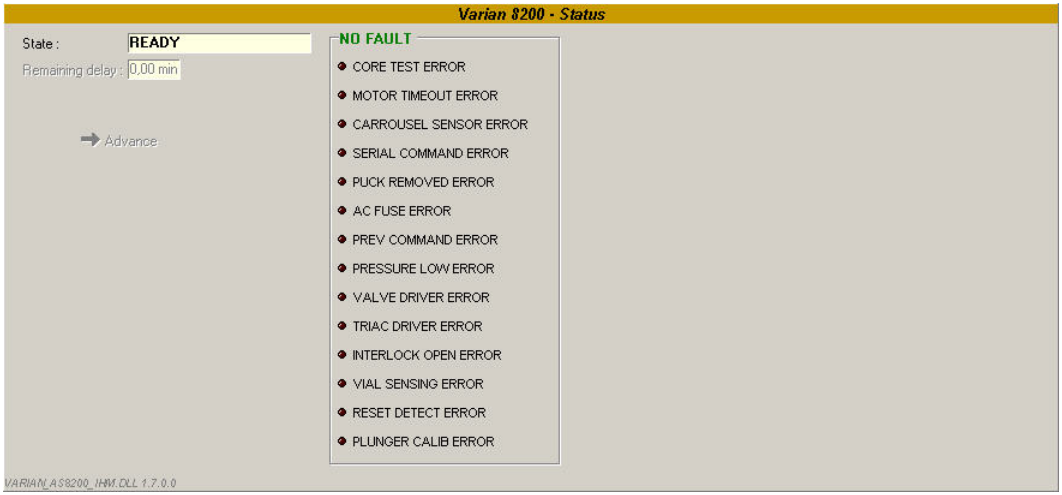
Viewing a Running Acquisition

To view a running acquisition, click on the *Systems* tab then select the running system. A window is activated which is composed of two parts: the running chromatogram and the status window where the driver modules are listed.

Status of the CP-8200 / SPME

Click on the button corresponding to the CP-8200 / SPME driver and the CP-8200 / SPME status screen will appear. It contains one sub-section: *Status*, and *Overview*. Click on the required sub-section to display the corresponding parameters that will be used during the chromatographic run.

Status Window



State: Displays the instrument state (communication state, automix state, injection state, etc.)

Remaining delay: Displays the remaining time before next step (reaction time, etc.)

Press the

button to advance the autosampler to the next state or step of an automix routine.

The following faults are displayed on the autosampler status with a red light (See CP-8200 / SPME Instrument manual for further information):

CORE TEST ERROR: This message is displayed if an error occurs at the instrument start.

MOTOR TIMEOUT ERROR: This error can occur if a part of the autosampler is jammed.

CAROUSEL SENSOR ERROR: This error can occur if the vial sensor PC board is defective

SERIAL COMMAND ERROR: This error can occur if a command has not been identified.

PUCK REMOVED ERROR: This error can occur if the vial tray is removed or not correctly mounted.

AC FUSE ERROR: This error can occur if the autosampler fuse is blown.

PREVIOUS COMMAND ERROR: This error can occur if the previous command has failed.

PRESSURE LOW ERROR: This error can occur if the 8200 controller PC board is defective, or the air supply pressure is below 40 psig, or the air pressure sensor tube/fittings are restricted.

VALVE DRIVER ERROR: This error can occur if one of the valves is plugged or defective, or if the 8200 controller PC board is defective.

TRIAC DRIVER ERROR: This error can occur if the position sensor PC board is defective.

INTERLOCK OPEN ERROR: This error can occur if the storage module is not closed.

RESET DETECT ERROR: This error can occur if the power has been interrupted to the autosampler.

PLUNGER CALIB ERROR: This error can occur if the autosampler is in incorrect position for calibration; or the carriage flex cable is unplugged or defective

Overview Window

Click on the Over View button: the *Status Overview* window is displayed and contains three tabs:

- *General:* displays the synopsis of the instrument, where some current values can be read (vial number, number of injection per vial, etc.).

When the mouse points to the colored vial (yellow for current used vial, green for already used vial and red for missing vial), the current vial and rack number and the number of injections are displayed.

Click on the Run vial check button and the sampler will detect which vials are present on the tray (represented by ◉).

- *Not ready*: contains the not ready information sent by the instrument.
- *Event*: contains the events that have occurred on the instrument.